The Xtal Set Society Newsletter

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Robert "Bob" Ryan, Jr.
A Short Story of Meeting A Radio Designer and Builder
By Randall Shreve KD7PCW

Back in the 1990s I was with Northrop Aircraft and one of our plants was located in Anaheim, California. Right down the street from this plant was a very nice electronics store. This, my friends, was the real deal, a true electronics store and was not one of the "Rat Shack" chain stores that seemed to Dot the landscape.

During my lunch breaks I would often visit this electronics store. In one of the glass display cases were these beautifully handcrafted radio sets. At a single glance from afar one might think that it was a display case of radio memorabilia.

However, these radios were not antiques, but were newly made handcrafted crystal and very unique "super regenerative" tube radios. Each radio was labeled "Handcrafted in America by Bob Ryan."

My personal interests in crystal sets stemmed from my grandfather's stories of growing up in upper New York State listening to local broadcasts on his cat's whisker radio set. Unintentionally my grandfather turned me into a radio addict when he presented me with an Olsen crystal radio set at the tender age of ten years old. The magic of the crystal set was powerful juju. Later in my "long hair" days I worked in the Broadcast Industry for a few local radio stations and often a crystal set would come in handy when listening to transmitter output.

By the time I was first introduced to these wonderfully handcrafted "Ryan" receivers in the 1990s I was a "radio junkie" deep into SWLing. Married and with children meant monetary priorities went elsewhere as these Ryan custom sets fetched a price beyond my normal means to justification to the XYL. So being the good little radio junkie I saved up my lunch money with the hopes that by the time I had enough funding squirreled away one of these sets would still be available as these babies seemed to fly off the shelve.

Regenerative radios... These were interesting and exotic rigs that fascinated me. I soon found that there is nothing that compares to the thrill of passing over a station's heterodyne whistle while tuning one of these sets only to come back and fine tune and adjust to obtain perfect audio. Honest, I really tried hard not to drool on the glass counter while test-driving these Ryan radios. My lunchtime visitations became so regular that to save time the proprietor got to the point of just pulling the radios out of the cabinet prior to my noontime visits.

As I mentioned, these sets were by no means inexpensive, but the level of detail, the beautiful craftsmanship, perfectly wound coils, custom printed handbooks made these radios something really special. Finely the day came and I purchased a Ryan regenerative set. It was a tough choice as the Bob Ryan crystal set (called the "Red Robin") that I had also been playing with was a real treat. I had never seen or listened to a set that performed like the "Red Robin " it was truly an amazing set and even with just a short six foot piece of scrap wire and no ground this crystal set really pulled in the local stations with exceptional selectivity. It was the cat's pajamas of crystal sets!

The Ryan regenerative set was just too fun so I decided on this unique multi-band one tube receiver. Now that I

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owned one of these handcrafted radios I wanted to meet this Ryan fellow. He was somewhere in Anaheim, how hard could it be, right?

All I could get out of the owner of the electronics store was that Bob Ryan was a local guy who builds radios as a hobby. "Yeah, well Bob kind of comes and goes, we see him when he needs some tubes" was it. Bob Ryan was not listed in the phone book and the Internet was no help. So Bob Ryan was a mystery man. As the decades rolled past I would, from time-to-time, run up his name on the Internet with no success. Occasionally I would see a "Bob Ryan" mentioned in a Popular Communications magazine article. Again, I would fail to local Mr. Ryan as he was simply "off the grid."

Sometime after joining the XTAL Set Society I came across a short article in the Society's Newsletter written by Bob Ryan. My conclusion was it had to be the same fellow and with the help of "Queen Mum" after 20+ years I was finally able to introduce myself to this elusive radio builder.

From our first contact Bob Ryan proved to be a true gentleman, extremely friendly and knowledgeable radio builder.

A fascinating self taught radio engineer and set builder, Bob picked up the love for creating radios during his boyhood years as World War II gripped the nation. Bob, an avid reader, studied designs by reading old "Short Wave Craft" magazines and collecting discarded radios for parts. Bob shared graphic stories of the hazards that young radio builders going through old sets had to be mindful of as new radio parts were hard to obtain due to the War Effort: "*Ahhhh, spiders, geez!*" were Bob's words.

With salvaged parts and various designs at hand the young Ryan built crystal and regenerative radios that enabled him and others to listen to the world at war. These childhood radio intercepts were the stuff that, are now reenacted in movies today, gives chills when I think of how it must have been, late at night with his "cans" tightly pressed upon his ears, young Bob followed the war as it raged in Europe, Africa and the Pacific. Imagine what it must have been like to hear war news, enemy propaganda and music as the RF came dancing down Bob's antenna.

Once the war was over his love of building radios and studying various crystal and Armstrong based designs did not go to the wayside. Instead, Bob continued to read articles and correspond with many noted designers and authors of the day building and testing receivers as time permitted.

During his teenage years Bob spent time in Japan studying the culture that had just a few short years before been our enemy. As a side note, during 1956 Bob was in close proximity with the famous Japanese aviator that had shot down the equally famous U.S. Marine Ace "Papa" Boyington as well as meeting several retired Japanese Naval Admirals (Bob related that these Admirals were some of the most charming people that he had ever met in his travels).

Sometime during the early 1950s Bob's parents moved into a nice home in Anaheim, California while building a chain of Women's Clothing Stores in the Southern California area. Bob continued to experiment with various designs as he purchased war surplus test equipment and other gear mainly for the vast selection of quality parts. Bob commented more than once that many of these designs sounded better on paper then in actual performance.

What Bob and I later found to be ironic was that his parent's first store, in which he worked, was located in the Lakewood City Mall. My Mother, with me in reluctant tow, shopped at the Ryan's store. What a hoot for Bob and I to discover that we had both shared the same sidewalk as well as been visitors of the then very popular Clifton's Cafeteria located at the Mall. Wow, talk about small world!

By this point Bob was now living in Hemet, California after moving out of the city of Anaheim. During his time in Anaheim he watched it grow from orange groves, to Disneyland to a major metro-area of Los Angeles.

Gosh, we both wished that we had somehow meet up decades earlier. However, a deep friendship quickly developed centered upon our common interests. Bob's ability to consume books truly amazed. Same with the

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use of his favorite writing instrument, the typewriter.

No Internet for Bob, happily calling himself a dinosaur as the Internet would just take time away from helping care for his aging friends in the retirement community of Hemet. Ah, the typewriter… In short order Bob got me hooked on something that many of us in today's world of the Internet Superhighway have forgotten, the simple joy of receiving a real letter in the Postbox. Truly, try it sometime and you will rediscover Bob Ryan's little secret, the posted letter means more to the soul than Internet e-mails!

Interestingly Bob's first purchased "kit" receiver was one of Elmer Osterhoudt's popular Modern Radio Labs 3Q5 tube regenerative rigs with plug in coils. As a young man Bob became friends with Mr. & Mrs. Osterhoudt and spent many Sundays together back in the day. Bob was also acquainted with Hugo Gernsback, famous for the "Shortwave Craft" and "Radio Craft" magazines of the 1930s, 40's.

By the time I met Bob he had given up bench work due to health reasons. However, as my personal passion for regenerative receivers grew Bob shared concepts, technical information, tube types and how he manufactured the various sheet metal and other components.

My 1990 purchase of the Ryan regenerative receiver earlier mentioned was Bob's melding of concepts around a main design platform "The Worcester's 1933 Oscillodyne." This receiver uses a single #30 tube with 1.5 volts for the "A" battery and 45 volts for the "B" battery with various plug in coils for both AM broadcast and various popular shortwave bands. With a good ground and short random wire antenna this regenerative receiver really performs. It's a bit of a tiger to first learn how to control regeneration, but once learned it's a sweetheart.

Some readers might find it of interest that in the fact there are countless thousands, if not millions, of regenerative receivers are still in daily use from controlling Industrial devices to home garage door openers. The 101-year-old design is still alive and well! Over the course of years I have found that, at times (in fact often) that a well made regenerative receiver will out perform many modern shortwave sets in its ability to dig out weak signals.

In the year 2000 Bob had taken another older design, the "Short Wave Craft" magazine award winning "1932 Harold Johnson Circuit" and performed a similar melding of design modifications for a another one tube regenerative receiver. By this point Bob had built and tested hundreds of different designs both foreign and domestic and felt that for the minimal part count required that this design was a true winner. One of the several interesting design changes that Bob introduced into this 1932 creation was the use of a three-foot whip antenna. Due to antenna restrictions at Bob's retirement QTH, Bob recognized that antenna restrictions were going to be a real problem for many of us now, and in the future. Experimentation with shorter than normal antennas became a focus out of necessity. Indeed, with a good set of headphones this little receiver with its 3-foot whip is a surprising performer.

From tubes to antennas, to inventors, from science to the greater world at large Bob Ryan's motto "History is my religion and Shortwave Radio is my Magic Carpet" along with his up-beat persona "I laugh at old insomnia and just hop to my shortwave receiver in my living room if I cannot sleep" and his desire to help his neighbors shows optimism with kindness. Truly, the high road approach to life.

Last year when I indicated that I was going to run an amateur radio event station on 20 meters in celebration for the 100th year anniversary of the first transcontinental telephone line, Bob quickly sent me a book that contained an original in-depth article about the transcontinental telephone line. The article even included interviews with Alexander Graham Bell, type of copper wire used in the construction as well as how many telephone poles were required for this historical and now forgotten event. Amazing!

Thanks to the Xtal Set Society and "Queen Mum" I am a lucky fellow to follow my quest to meet up with this amazing builder and could write volumes about my friend Bob Ryan, so much so that I wouldn't know where to exactly stop, except to say that on May 5th of this year Bob Ryan went Silent Key.

It was my honor and privilege to have been Bob Ryan's

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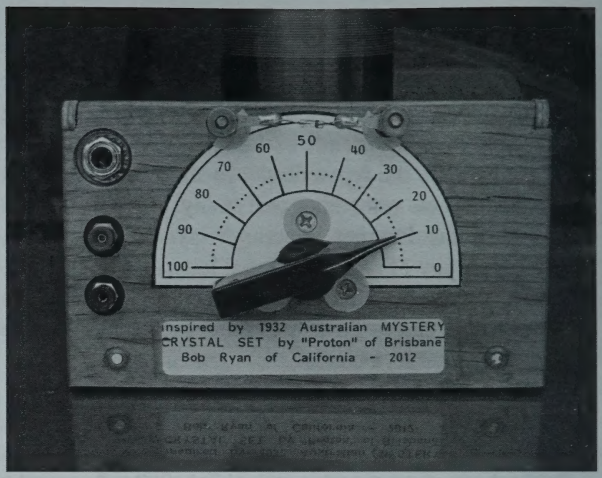
last "Radio Scout" and while he will be deeply missed, he was a radioman who left his positive mark on those he touched. He truly loved the Xtal Set Society and it's wonderful newsletter as a meeting place for likeminded radio enthusiasts to write and share ideas. Bob was a humble man and once told me "*its not so much that I love shortwave, yes I can and will sit still and listen to cultural music even in a foreign language, but its the simple fact that each time I flip the switch I am still amazed that I am listening on a radio that I made with my own hands.*"

I don't think that it gets any better then that... 73



Editor's note: One of Bob's beginner radios is featured in the September 2012 issue. I have repeated the picture here.

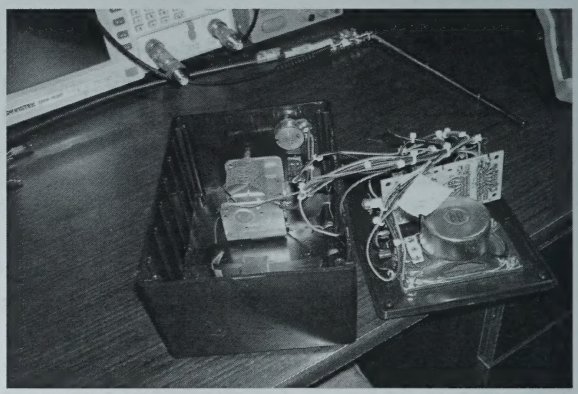
Chip Ohleiser's MK484

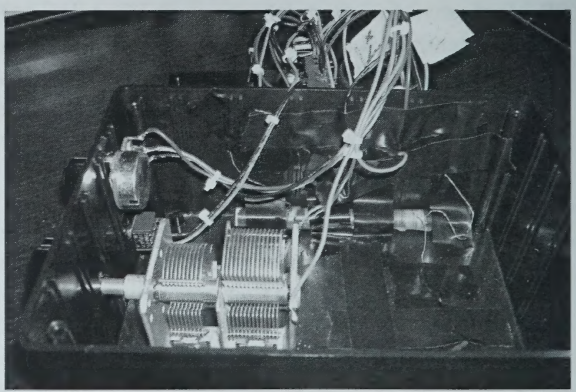
I built this mk484 chip radio using many XTAL SET SOCIETY parts. It was built about 2 years ago.

It works great, and is sensitive and loud.

FEATURES

- MK484 single chip radio chip from Xtal set society
- LM386 audio amplifier for plenty loud audio
- Large 2 pound magnet oval speaker for full range audio and loud sound
- Loopstick antenna internal to set
- Vernier slow-tuning tuning capacitor from XTAL SET SOCIETY
- Internal 9V battery, about 60 days life
- Plastic high impact case
- SENSITIVE! 70 DB dynamic range with agc contained in the mk484 chip





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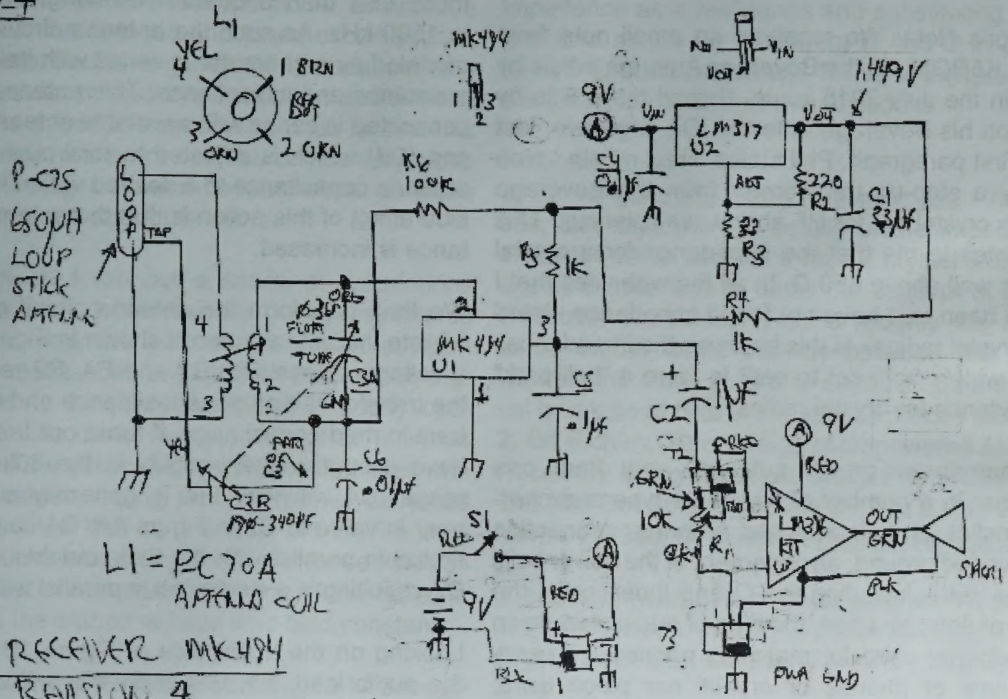

MK484 REVISION 4 BCB RECEIVER PARTS LIST

9/4/2014 15:08 SHT_____OF _____

REV 4

MK484 BCB RECEIVER	DESCRIPTION	P/N	QTY	REF DES	
	8 OHM SPEAKER 4X4 8 OHMS S300SA	70115843	1	SPKR 1	$4.00
	AMP AUDIO LM386 KITS AND PARTS DOT CPM	LM386	1	LM386	$8.00
	BATTERY 9 VOLT BATTERY 4 PACK	23-866	1	B1	$2.75
	capacitor, .01µF, 50V	55047551	1	C6	$0.47
	capacitor, .1 µF, 50V	55047557	2	C4, C5	$0.47
	capacitor, 0-365 PF MAIN	365 AIR VARIABLE	1	C3	$10.95
	capacitor, 1.0 µF, 25V	55047773	1	C2	$0.47
	capacitor, 3.3 µF, 25V	55047829	1	C1	$0.47
	CASE PLASTIC CASE	-	1	CASE	$7.00
	COIL ANTENNA COIL	P-C70-A	1	L1	$8.95
	COIL ANTENNA LOOP STICK 650 UH	P-C75	1	ANTENNA	$2.95
	HARDWARE, MISC	-	-	-	$2.00
	IC LM317 REGULATOR CHIP TO-220 PKG	LM317 TO220	1	U2	$1.50
	IC MK484 RADIO IC	MK484	1	U1	$1.50
	KNOB BLUE	274-0403	2	KB	$2.98
	PWB, PROTYPING, BARE	276-0148	1	PWB	$2.49
	RESISTOR 5 K OHM VAR AUDIO TAPER	271-1720	1	R1	$3.49
	resistor, 1 K	271-1118	2	R4, R5	$0.30
	resistor, 100K	271-1347	1	R6	$0.30
	resistor, 33 OHM	271-1104	1	R3	$0.30
	resistor, 220 OHM	271-1313	1	R2	$0.30
	SWITCH SPST		1	S1	$3.00

NOTES:
REV 3 NO PARTS ADDED
COST REDUCED RESISTORS 5 PACK, ONLY NEED 1
COST REDUCED BATTERY 4 PACK, ONLY NEED 1

TOTAL COST $51.48

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Impedances of Crystal Sets
By Phil Anderson, WØXI

{Editor's Note: We received an email note from Ron, K5RGM, on the Beverage Antenna article by Phil in the July 2015 issue. "I read the article by Phil on his Beverage antenna. On page two, last line first paragraph, Phil states 'Next month I plan to try a step-up transformer from the Beverage into a crystal set for HF shortwave listening.' This indicates to me that the impedance for a crystal set is well above 450 Ω. In all the web sites that I have been to, I have not found impedance stated for crystal radios. Is this because the impedances vary widely from set to set? Is there a "ball park" impedance for crystal radios?"]

All homebrew crystal sets will vary from one another in a number of ways: the type and characteristics of their attached antenna, connection to a varied ground, arrangement of the coil or coils in the set – including the Q and those coils, the type of detector used, the type of audio step-down transformer used for matching phones – if used, the type of phones or crystal ear piece used, and more. As a result, one cannot really define a specific impedance for crystal sets. At the same time, *some long-time crystal radio enthusiasts have loosely grouped crystal sets by the effective impedance of the diode detector used.* As was discovered in the last few decades, a high-impedance diode can assist a crystal set utilizing a high-impedance antenna and tank circuit (hi Q), thus improving selectivity and weak signal detection. In addition, a matching transformer must be added to match the lower impedance of the headphones. The result is a high-Q set wherein the impedances before and after the detector diode match its crossover resistance (1).

To get a feel for the operation of such a set and to estimate the best values for the components given a specific diode, we'll examine the circuits shown in Figures 1A, 1B and 1C. Let's start with 1A, which is a schematic of a simple single-tank (LC) crystal set. The antenna is shown series-coupled with a variable tuning cap (C3) and attached to the parallel tuned circuit (C2 and L1). Since nearly all crystal sets are made for the AM broadcast band, the length of a single wire antenna will be much less than a quarter-wavelength from 550 to 1500 kHz. As such the antenna circuit can be modeled as a generator in series with its effective resistance and capacitance. This antenna is then connected in series with a variable antenna tuning cap (C3) which is adjusted to minimize the total antenna capacitance to a desired value. A desired side effect of this action is that the antenna resistance is increased.

We then transform the antenna circuit of Figure 1A into the antenna circuit shown in Figure 1B as a voltage source with R2 and C4. R2 represents the transformed antenna resistance and C4 is the transformed capacitance. It turns out that R2 will have a large value, roughly in the 80k to 500k range. C4 will vary but is generally small and near in value to C2 in Figure 1A. C4 can then be added in parallel with the tank variable capacitor C2, resulting in a single cap in parallel with coil L1.

Looking on the audio side of Figure 1B, we see the audio load, R1. Generally this will consist of a step-up transformer, RF bypass capacitor and headphones. The whole audio circuit transformed to the primary (high side) of the transformer represents the audio load on the detector diode. For optimum performance, this load is matched to the diode's crossover resistance. (See Ben Tongue's website reference for details on determining the detector diode crossover resistance.)

Finally, let's resonate L1, C2 and C4 in Figure 1B and combine that with V1 and R2 (the antenna circuit). The result is a voltage source with source resistance R3 in Figure 1C. R3 and the effective audio circuit resistance R1 are designed to be close in value to the diode resistance for maximum signal reception.

This circuit might seem a bit odd. One usually expects when a generator is matched to a load that there are only two impedances, that of the generator and the load. For that basic circuit, we know that maximum power is transferred from a generator to the load when the generator and load

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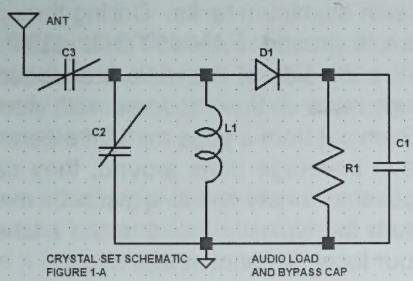
resistances are equal. Surprisingly, with our high-resistance diode crystal set, we've ended up with three resistors in series for the model, as noted in Figure 1C: the antenna and tuned circuit equivalent resistance (as a generator impedance), the diode resistance and the equivalent audio resistance (as a load). A second surprise is that this combination, while not optimal, comes very close to transferring maximum power when all three resistances are about the same.

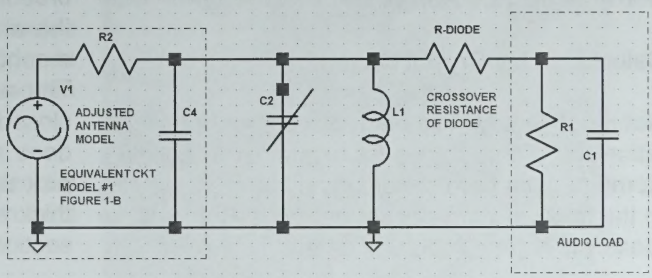
Just curious, I ran out a series of calculations shown in Table 1 below using 1 ohm resistors as nominal to keep the math simple. Note that when all three resistances are close to each other, e.g. 1, 1, and 1, the power delivered is nearly optimal. With the diode resistance kept at 1, I then increased the generator and load resistances with various values, noting that the power delivered was less than that at 1-1-1 or 1-1-2. The only combinations exceeding this were those listed in the first set of numbers at the top of the table. In all cases the source voltage was held constant.

The circuit transformations from Figure 1A through Figure 1C may be carried out using a number of circuit analysis techniques: equating a current source to a voltage source and vice versa, resonating a tuned circuit so as to represent its impedance as a resistance and substituting an R and C in series for a different R and C in parallel at a specific frequency. These techniques are described in circuit analysis textbooks.

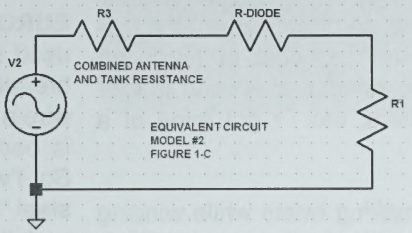
References:

1. B. Tongue, http://www.bentongue.com At this site, Ben lays out the details of the impedance of diodes when used in a high-Z crystal set. This site also describes in detail the concept of diode crossover resistance. This is roughly the resistance of the diode midway between the point wherein the diode begins to conduct and the typical break point (like 0.6 volts for a silicon diode).
2. Ed Richley, "The Design of Unpowered AM Receivers Using Detectors Made From Rocks," The Xtal Set Society Newsletter, Vol 5, No 2, March 1, 1995, available at www.midnight.science.com.
3. https://en.wikipedia.org/wiki/Saturation_current
4. Phil Anderson, WØXI, "A Great Teacher: The Crystal Set," QEX Magazine (ARRL), Sept-Oct, 2008





FIGURES 1A 1B AND 1C



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THREE RESISTOR MATCH
PHIL, WØXI 8/6/2015

rms Voltage Source	R1 Rant generator	R2 fixed Rdiode diode	R3 Raudio load	power at load
1	0.6	1	1	0.148
1	0.7	1	1	0.137
1	0.8	1	1	0.128
1	0.9	1	1	0.119
1	1	1	0.6	0.089
1	1	1	0.7	0.096
1	1	1	0.8	0.102
1	1	1	0.9	0.107
1	1	1	1	0.111
1	1	1	2	0.125
1	1	1	3	0.120
1	1	1	4	0.111
1	1	1	5	0.102
1	1	1	6	0.094
1	2	1	1	0.063
1	2	1	2	0.080
1	2	1	3	0.083
1	2	1	4	0.082
1	2	1	5	0.078
1	2	1	6	0.074
1	3	1	1	0.040
1	3	1	2	0.056
1	3	1	3	0.061
1	3	1	4	0.063
1	4	1	5	0.050
1	4	1	6	0.050
1	4	1	1	0.028
1	4	1	2	0.041
1	4	1	3	0.047
1	4	1	4	0.049
1	4	1	5	0.050
1	4	1	6	0.050

Power out for 3 resistors in series, rather than just two for maximum power transfer to load.

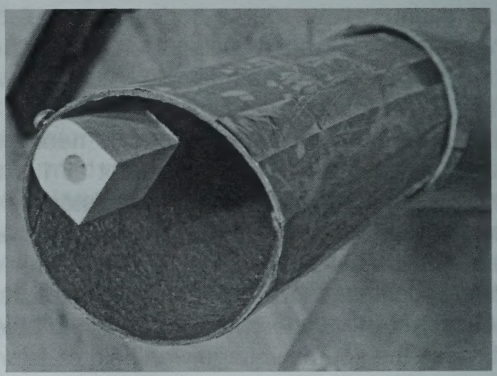
Some ideas from Ron Sindric

Salutations My Crystal Queen !

Not much to say. I've been playing around in isolation with some things for crystal radio building. Some of what I am sending you might already be in the lexicon of crystal set building. Some of my ideas will hopefully be unique and useful.

For making electrical capacitors, there is adhesively backed aluminum available in hardware stores. This stuff will conduct and is used to seal HVAC ducts, rain gutters, etc. I got mine at a MENARD'S STORE.

After fiddling around making twists while winding multi-tap coils, I decided to do things a bit different. Starting with a cardboard tube reinforced with a coating of carpenter's glue, I glued a basswood strip to the inside of the tube. Brass-plated steel eye-screws were then mounted through the tube's cardboard and secured into the basswood strip on the inside of the tube. Small pieces of basswood attached to the inside of the tube can act as a coil mounting to a breadboard. If you were to use a plastic bottle, removing the label and leaving the sticky label mounting adhesive gives you a surface that grips the wire bette that you are using to make a coil.



To provide a cheap ground plane for my radios, I cut up some large beverage cans and attached the aluminum from the can to the bottom of the breadboard with aluminum tacks. Drilling through the aluminum, a ground **FAHNSTOCK CLIP** is mounted to the top-side of the radio breadboard. The aluminum base is then covered with some closed cell foam cut from a yoga matt. If a person does not have beverage cans around, they can pick up disposable turkey roasting pans or even thick aluminum foil typically found in the kitchen section of your local discount stores.

EURO-STYLE terminal strip connectors can be used surface mounted on a wooden breadboard breadboard to provide an easy way to quickly rewire a radio circuit. Finding **FAHNSTOCK CLIPS** is becoming more and more difficult every day. So, I've started using either brass or brass-plated steel "angle brackets" along with machine screws and thumb-screw nuts for antenna and ground connections.

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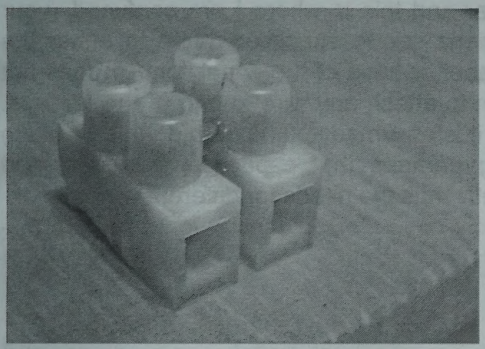
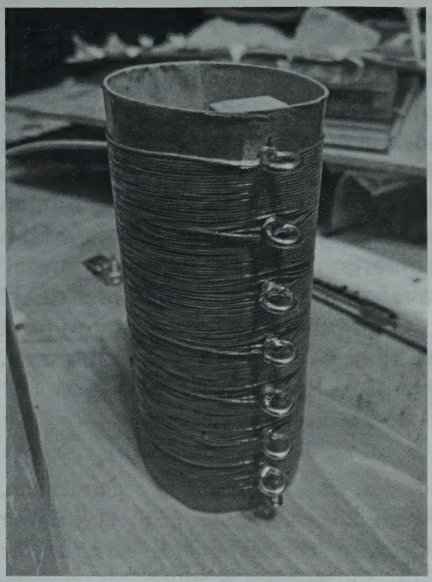
The same **EU TERMINAL STRIPS** can be used in place of **FAHNSTOCK CLIPS** for attaching the pin-plug ends from old-style headphones to a breadboarded radio.

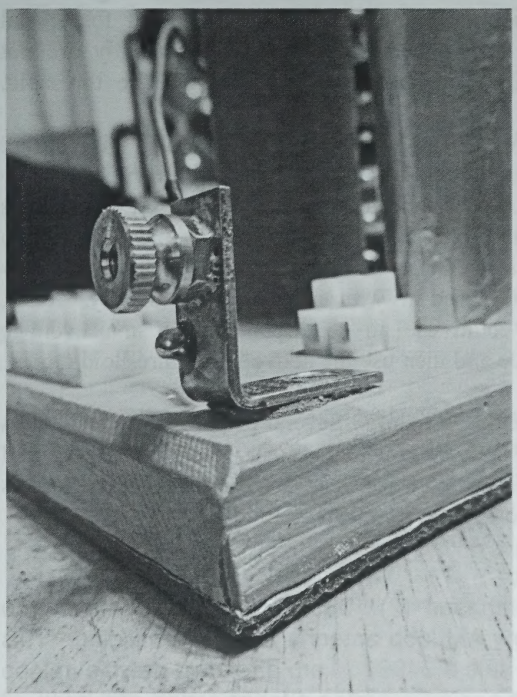




If you have a cardboard coil form that is not the right diameter, the tube can be carefully cut down its length. A strip of curved cardboard from another paper tube can be carpenter's glued to the inside edge of the tube along the cut. This would allow for an expansion of the tube to make a larger diameter coil. Cutting a strip from one edge along the original slit and using the glued-in strip would allow the builder to create a slightly smaller diameter coil mounting tube.

Small pieces of basswood mounted to the inside bottom of a coil form would allow the builder to easily mount her or his coils vertically to a wooden breadboard.

I am attaching a few pix for reference. If even one person takes to just one of these ideas, then I will be a happier man.



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Xtal Corner: Member Correspondence

Hello. Thanks for the cool web site.
My grandson and I are wondering if, instead of using the normal type diodes, whether anyone has tried using some of the modern-day LED light diodes that are found in so many homes today for use in lighting. Great to know in the event of an emergency when no other 'normal' parts are available for making a broadcast band radio. Or, do they not work? If you post this, we'd be most interested in the responses.
Thank you, Mark St. Augustine, Florida

Hi Mark,
The crystal diodes, like the 1N34, are germanium, and as such start to conduct at (~.3V) at a lower voltage than regular contact diodes such as the popular 1N914. LEDs have a much higher conduction start and as such are not used for crystal sets since the AM radio signals generally are not strong enough to overcome this voltage threshold.

However - there is always an however - if you are willing to bias the LED with a **battery** and resistor.....it will indeed work in a crystal set. Crystal sets in the 1920s and 30s often used a piece of carbon and a needle as the detector; but, in that case they often biased it with some sort of battery. Today, you could use an solar panel as a small voltage source and then use the above larger threshold diodes.

Hope that is helpful. Several of our newsletter writers have outlined how to use solar panels in this way, as I recall within the last year. You can purchase backorders of most of our newsletters. Enjoy!

Hello-
I purchased (2) 365 PF Capacitor's your you for my AM loop antenna that I am building. This was sale # 34960 I am a relative newbie in loop antennas but learning a lot as I read and build. I need some guidance please on how to properly wire up this capacitor. I read the instructions and other material on this and need to ensure I am doing this right.

I have the two wire ends which I need to connect to the capacitor. I thought I needed to connect one wire end to one of the four lugs at the bottom of the capacitor (this must be soldered) and then the other end of the wire to either the front panel or the base (bottom) using a 6/32 screw. However and this is where I am confused your instructions say to attach one wire to either the front panel or base of the capacitor.. It does not mention to attach any wire to one of the for lugs. Maybe it is assumed you have to do this. I am thinking perhaps that capacitors can designed differently thus the needs for different wiring hookups. Any advice or guidance would be appreciated. David Turnick

Hello David,
The Xtal Set Society and xtal set builders use the dual gang as an antenna tuner. How the mag loop guys use it for tuning a mag loop may be different. However, the following may be helpful: The frame of the dual gang cap and 1/4 inch shaft sticking out the front are shorted to both rotor sections of the dual gang. Hence, to connect to the rotors you must connect a wire to the frame of the capacitor.

Here you can use one of the bottom three holes, threaded for a 6-32 screw with a solder lug under the head of the screw or one of the two threaded 6-32 holes at either side of the top of the front of the frame (where the shaft comes out).

The stators of the two capacitors are NOT connected together and each is isolated from the frame. Connect to either one of the set of stator plates by soldering a wire to the solder lug on either side of the selected section.

I suspect that the leads coming from the dual gang stators go to the two coils of the mag loop but am not sure; I have not experimented with mag loops.

A note of caution. Many callers have asked us what voltage our dual-gang caps can handle. The reason for this is that it has been said that mag loop antennas can create very high voltage when hi power is applied. Our caps only have 15 mils separation between plates, which according to Passion's Law would indicate air breakdown (arching) at somewhere around 300 volts. I have seen some a few mag loop antennas designed for

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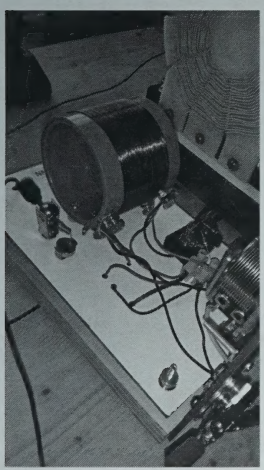
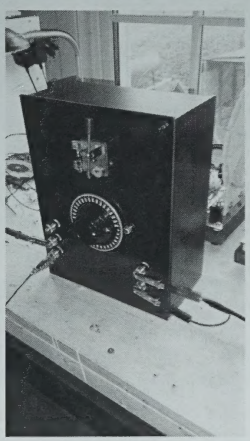
high power with capacitor tuning plates that are quite widely separated. Hope this is helpful. 73

From Gary Thorne:
Here are some sets I have been working on. I will send you copies of a couple articles I wrote. You can go to our club website and view stuff also: k9zev.org
I will show your newsletters at my table for our Hamfest if that is ok? Thanks





Gary, What happened to your articles? Patricia

A question for "Grandpa Phil":

What are the real differences of the different grades of variable capacitors, relating to Xtal set use? Is it worth the trouble and expense to search out a "holy grail" capacitor, with the ceramic insulators, extra wiper contacts, and fancy plate shape? Thanks! Anthony L Dunn

Hi Anthony,

Depends upon what your desires are. The regular caps that we sell are pretty good but not mint.....Mint, or "best" has to do with the Q of the capacitor and how it is paralleled with a coil for the resonant circuit.

For really weak signal work and very narrow bandwidths, one likes to get the best Q for both the capacitor and coil in the tuned circuit. Since the antenna circuit already has loss primarily due to the real impedance of your ground, there is no reason to use the most expensive capacitors in that part of the circuit.

The very sensitive crystal sets use high impedance crystals or detection circuits. One can poor boy that down by using a JFET transistor as the detector. That way the audio circuit of the set does not drag down the Q of the tuned circuit.....that would likely use Litz wire on a low-loss form in parallel or otherwise with a capacitor that has nylon or similar standoffs (to hold he rotor and stationary plates apart) rather than the standard phenolic PCB sections like you see in our traditional 365 uuf variable caps. Most hobbyists are unaware of the difference and are often first time builders.....so that's ok.

Basically, you'll get that last 10% of the signals you couldn't get with the standard caps. But, that last 10% will be costly. Same old tradeoffs in life.

If you are interested in the technical details, search for Ben Tongue's website.....on super optimizing a set for the last 10 percent.

You can get some insight into this process from a paper I wrote for ARRL back in September 2008 in their QEX magazine.

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8-31-15

THE XTAL SET SOCIETY

e-mail: xtalset@sunflower.com
Phone: 405-517-7347

We are dedicated to once again building and experimenting with radio electronics, often—but not always—through the use of the crystal set, the basis for most modern day radio apparatus. This newsletter helps support our goal of producing excellent quality technical books that encourage learning and building. To join the society and receive one year of the bi-monthly newsletter, remit $14.95 to The Xtal Set Society. Canadians, please remit US $15.95. Outside the US and Canada please remit US $21.95.

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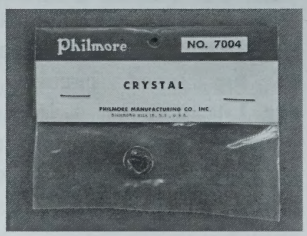
Founder &Columnist– Philip N. Anderson, WØXI
Editor & Queen Mum- Patricia, NØGZZ
Columnist- J.K. Fenton
Columnist- Dan Petersen, W7OIL email: dan.w7oil@gmail.com

Occasionally in our coming and going, we come across some special items. These Philmore items were found on such a trip.

Mounted Galena - Philmore 7004



The Philmore 7004 is a single mounted galena crystal; that is, the galena rock is set in a disc of woods metal. The disc fits in our brass cup holder found on our parts page. It also fits in a cup included in the Philmore 7010 Unmounted Galena Detector; see the next item. **Mounted Galena Philmore $4.95**

Unmounted Crystal Detector Philmore 7010

The Philmore 7010 is an unassembled (unmounted) crystal detector kit. While a bit hard to see in the package, it consists of a handle on a rod, a cat whisker, a ball joint and U-shaped holder for the ball and rod, with screw and nut. **Unmounted Crystal Detector Philmore $5.95**

ORDER FORM (5/2013) Description	Cat#	Qty	Price
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TOTAL Kansas residents please add appropriate sales tax			

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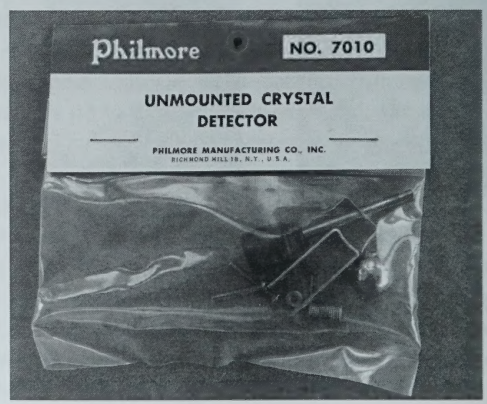

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